DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

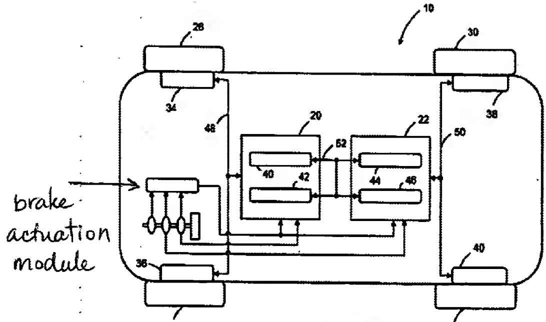
> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-12, 17 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (from here on will be referred to as AAPA) of Figure 1 in view of Kato et al. (USP 5,548,601) and further in view of Kidston et al. (USP 5,615,933).

Re: claim 1, Figure 1 of AAPA teaches a brake control system, as in the present invention, comprising: a first pair of brake control units 34, 36; a second pair of brake control units 38, 40; a first brake control bus 48 which is operatively connected to each of the respective ones of said first pair of brake control units; a second brake control bus 50 which is operatively connected to each of the respective ones of said second pair of brake control units; a first supervisor controller 20 which is operatively connected to said first brake control bus and adapted to control and monitor each of the respective ones of said first brake control unit pair through said first control bus; a second supervisory controller 22 which is operatively connected to said second brake control bus and adapted to control and monitor each of the respective ones of said second brake control unit pair through said second control bus; a controller bus 52 which is operatively

connected to each of said first supervisor controller and said second supervisory controller; and a brake actuation module in signal communication and adapted to provide a brake signal to each of the first and second supervisory controllers as marked in figure 1 below. Figure 1 of AAPA lacks a computer based monitoring controller which is operatively connected to said controller bus and adapted to monitor the performance of said first supervisory controller, said second supervisor controller, said first brake control bus, and said second brake control bus. Kato et al. teach the concept of a monitoring controller 80, 85 which is operatively connected to said controller bus Td1, Td2 and adapted to monitor the performance of said first supervisory controller CPU1, said second supervisor controller CPU2, said first brake control bus Td1, and said second brake control bus TD2, as shown in figure 5 and column 7, line 30, in order to improve the ability to detect fault in a brake system to provide more reliable control to the brake system. Kato also shows monitoring controller 80, 85, first and second supervisor controllers CPU1, CPU2, each signally connected to a brake actuation module U in figures 1 and 3 of Kato. Kato further teaches in column 8, lines 8-12 that the monitoring controller is employed in actual slip control. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Figure 1 of AAPA to include a monitoring controller such as taught by Kato in order to improve the ability to detect fault in a brake system to provide more reliable control to the brake system. AAPA's brake control system, as modified by Kato, lacks a non-bussed, hard-wired connection for the brake actuation module. Kidston teaches the concept of using a non-bussed, hard-wired connection in a brake control system

wherein the brake control 66 is connected to the motor control 22 through dedicated lines (i.e. non-bussed, hard wired connection) 60, 62 and 64, especially 64 is designed to carry single bit signal, as stated in column 4, lines 7-15, in order to provide fast and reliable communication. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified AAPA's brake control system to employ a non-bussed, hard-wired connection in order to provide fast and reliable communication as taught by Kidston.



PRIOR ART

FIG. 1

Re: claims 2 and 20, Kato further teaches a brake control cutoff module 90, said module operatively connected by at least one controller signal line, signal line to A (abnormal condition), to said monitoring controller, said module also operatively connected by a first brake control line to said first pair of brake control units and by a second brake control line to said second pair of brake control units as shown in figure 1 of Kato, wherein said brake control cutoff module is adapted to receive a control input signal from said monitoring controller and selectively provide a control output signal to

one of said first brake control unit pair and said second brake control unit pair, and wherein the control output signal comprises a cutoff command to the one of said pairs receiving the control output signal, as shown in column 7, lines 49-54.

Re: claims 3 and 4, Kato further shows the brake control cutoff module comprises a latching relay having embedded control logic to control the latching of the relay in column 7, lines 49-54.

Re: claim 5, Kato shows in figure 1, the at least one signal line comprises a first logic line and a second logic line, and wherein the first logic line may be selectively operatively connected through the control logic to the first brake control line and the second logic line may be selectively operatively connected through the logic to the second brake control line.

Re: claim 6, Kato further shows a brake control cutoff module 90, said module operatively connected by at least one controller signal line to said monitoring controller, shown as signal line to A (abnormal condition), said module also operatively connected by a first brake control line to a first bus control which is operatively connected to said first brake bus and by a second brake control line to a second bus control which is operatively connected to said second brake bus, wherein said brake control cutoff module is adapted to receive a control input signal from said monitoring controller and selectively provide a control output signal to one of said first bus control and said second bus control, and wherein the control output signal comprises a cutoff command to the one of said first bus control and said second bus control receiving the control output signal, as stated in column 7, lines 49-54.

Re: claims 7 and 8, wherein the brake control cutoff module comprises a latching relay having embedded control logic to control the latching of the relay in column 7, lines 49-54.

Re: claim 9, Kato further shows in figure 1, wherein the at least one signal line comprises a first logic line and a second logic line, and wherein the first logic line may be selectively operatively connected through the control logic to the first brake control line and the second logic line may be selectively operatively connected through the control logic to the second brake control line.

Re: claim 10, Kato further shows a means for selectively disabling one of said first pair of brake control units and said second pair of brake control units in column 8, lines 8-11, said means in signal communication with said monitoring controller, said means connected by a first signal line to and in signal communication with said first pair of brake control units and connected by a second signal line to and in signal communication with said second pair of brake control units, said means adapted to receive a control input signal from said monitoring controller and communicate a control output signal in response thereto to disable one of said first brake control unit pair and said second brake control unit pair.

Re: claim 11, Kato further shows said monitoring controller is adapted to provide a warning indication using warning light 102 to an operator in the event that one of said first brake control unit pair and said second brake control unit pair is disabled.

Re: claim 12, Figure 1 of AAPA in combination with Kato shows said first supervisory controller and said monitoring controller comprise a first fail-silent pair and

said second supervisory controller and said monitoring controller comprise a second fail-silent pair in that said monitoring controller is monitoring the performance of the first and second supervisory controller to detect abnormal condition and disabling one of the supervisory controller when an abnormal condition is detected, as stated in column 8, lines 8-11.

Re: claims 21 and 22, Figure 1 of AAPA shows all the claimed features of claims 21 and 22.

Re: claim 17, Figure 1 of AAPA shows a brake control system, comprising: a first pair of brake control units 34, 36, a second pair of brake control units 38, 40, a first brake control bus 48 which is operatively connected to each of the respective ones of said first pair of brake control units, a second brake control bus 50 which is operatively connected to each of the respective ones of said second pair of brake control units; a first supervisory controller 20 which is operatively connected to said first brake control bus and adapted to control and monitor each of the respective ones of said first brake control unit pair through said first control bus; a second supervisory controller 22 which is operatively connected to said second brake control bus and adapted to control and monitor each of the respective ones of said second brake control unit pair through said second control bus; a controller bus 52 which is operatively connected to each of said first supervisory controller and said second supervisory controller; a brake actuation module in signal communication and adapted to provide a brake signal to each of the first and second supervisory controllers as marked in figure 1 above. Figure 1 of AAPA lacks the computer based monitoring controller and a cut off module as claimed. Kato

et al. teach and a monitoring controller 80, 85 which is operatively connected to said controller bus and adapted to monitor the performance of said first supervisory controller, said second supervisory controller, said first brake control bus, and said second brake control bus; and a brake control cutoff module 90, said module operatively connected by at least one controller signal line to said monitoring controller, said module also operatively connected by a first brake control line to said first pair of brake control units and by a second brake control line to said second pair of brake control units, wherein said brake control cutoff module is adapted to receive a control input signal from said monitoring controller and selectively provide a control output signal to one of said first brake control unit pair and said second brake control unit pair, and wherein the control output signal comprises a cutoff command to the one of said pairs receiving the control output signal, as stated in column 7, line 30 and lines 49-54, in order to improve the ability to detect fault in a brake system to provide more reliable control to the brake system. Kato also shows monitoring controller 80, 85, first and second supervisor controllers CPU1, CPU2, each signally connected to a brake actuation module U in figures 1 and 3 of Kato. Kato also teaches in column 8, lines 8-12 that the monitoring controller would be employed in an actual slip control. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Figure 1 of AAPA to include a monitoring controller such as taught by Kato in order to improve the ability to detect fault in a brake system to provide more reliable control to the brake system. Paragraph [0018] of AAPA, especially lines 12-17, teaches that the construction of control modules is well known and readily available.

Hence, it would be within skills of an ordinary person to employ any of these commercially available control modules.

3. Claims 13, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted Prior Art (from here on will be referred to as AAPA) of Figure 1 in view of Kato et al. (USP 5,548,601), in view of Kidston et al. (USP 5,615,933) and further in view of Weiberle et al. (US 2003/0006726 A1).

Re: claim 13, the brake control system, as rejected in claim 1, lacks the claimed three signals from three sensors of claim 13. Weiberle et al. teach the use of three sensors to provide an accurate detection of the driver's operating braking command in paragraph [0028], lines 1-4. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified Figure 1 of AAPA to include a third sensor as taught by Weiberle in order to accurately detect the driver's operating braking command.

Re: claim 18, the brake control system, as rejected in claim 17, lacks the claimed three signals from three sensors of claim 18. Weiberle et al. teach the use of three sensors to provide an accurate detection of the driver's operating braking command in paragraph [0028], lines 1-4. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified Figure 1 of AAPA to include a third sensor as taught by Weiberle in order to accurately detect the driver's operating braking command.

Re: claim 19, Figure 1 of AAPA in combination with Kato shows said first supervisory controller and said monitoring controller comprise a first fail-silent pair and

said second supervisory controller and said monitoring controller comprise a second fail-silent pair in that said monitoring controller is monitoring the performance of the first and second supervisory controller to detect abnormal condition and disabling one of the supervisory controller when an abnormal condition is detected, as stated in column 8, lines 8-11.

Response to Arguments

4. Applicant's arguments filed 10/05/07 have been fully considered.

- Applicant argues that Kato's watch dog circuit can not be equated to the computer based monitor controller as claimed because Kato's watch dog circuit is a mere circuit while the claimed monitor controller is a commercially available computer based monitor controller. The Examiner would like to point out that these are electronic devices. It is believed that these electronic devices such as power PC, computer, controller, etc. comprise electronic circuits that allow them to perform various functions according to the programs or softwares that are being used with these electronic devices. Therefore, Kato's watch dog circuit performs the same task of monitoring to ensure the proper working of the brake system and would meet the claimed computer based monitor controller.
- Applicant further argues that it is unreasonable to interpret Kato's CPU1, CPU2 as separate controllers then interpret U as a brake actuation module because U is the same as CPU1 and CPU2. It is noticed that in paragraph [0015] of Applicant's specification, Applicant mentions the options of having separate

controllers and having one common controller. Again, it is believed that Kato's U is an electronic device that comprises many smaller controllers that perform different tasks depending on the programs that are being used. In this case, U can actuate the brakes, CPU1, CPU2 and the watchdog circuit together control and monitor the well being of the brake system in the same manner as Applicant's.

- Finally, Applicant argues that Td1 and Td2 can not be interpreted as control bus because control busses are for data communication. It is believed that "data communication" in an electronic system comprises of electronic signal transportation. Td1 and Td2 do just that, they communicate (or ouput) the data (or electronic signals) from CPU1 and CPU2 to the watchdog circuit. Hence, it is concluded that Td1 and Td2 perform the task of control busses as claimed.
- For these reasons, the rejections are still deemed proper and are repeated above.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Nguyen whose telephone number is (571) 272-7121. The examiner can normally be reached on Monday through Friday, 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Siconolfi can be reached on (571) 272-7124. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Xuan Lan Nguyen/ 1-16-08
Primary Examiner
Art Unit 3683